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EXAMINER

NGUYEN, LINH M

ART UNIT PAPER NUMBER

2816

DATE MAILED: 07/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/088,205

Applicant(s)

TAKEO ET AL.

Examiner

Linh M. Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 May 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) 3-5 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1, 2, 6 and 7 is/are allowed.
- 6) ☒ Claim(s) 8-12, 14 and 15 is/are rejected.
- 7) ☒ Claim(s) 13 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 July 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

This is a reply to the Applicants' response submitted on 05/19/2003. According to this response, the Applicants elected Embodiment I including claims 1-2 and 6-7, newly added claims 8-15 are also submitted for consideration; thus, claims 1-2, 6-7 and 8-15 are now presented in this instant application.

Inventorship

1. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Drawings Objection

2. The drawings are objected to because of lacking "Prior Art" label in figures 13-15 and figures 13-15 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Abstract

3. The abstract of the disclosure is objected to because it includes two separate paragraphs, the abstract should be limited to a single paragraph. Correction is required. See MPEP § 608.01(b).

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000.

Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

5. Claims 8 is rejected under 35 U.S.C. 102(e) as being anticipated by Reed et al. (U.S. Patent No. 6,493,163).

With respect to claim 8, Reed et al. discloses, in Figure 2, a phase detector circuit that outputs a DC voltage signal associated with a phase difference between an input random NRZ signal [Yo] and a second signal related to the input random NRZ signal [So] comprising 1) a delay circuit [210] for delaying the input random NRZ signal by an amount related to a period T of the input random NRZ signal and outputting a delayed signal; and 2) a combination of at least

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one multiplier circuit [230,231] and a subtractor circuit [240], which combination performs a mathematical operation on the input random NRZ signal, the delayed signal, and the second signal to produce an output signal having a DC voltage component corresponding to the phase difference.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reed et al. (U.S. Patent No. 6,493,163).

With respect to claims 9 and 10, Reed et al. discloses all of the claimed limitations as expressly recited in claim 8; furthermore, Reed et al. discloses that the second signal differs from the input signal by a phase angle θ as shown by the phase error data. Reed et al. fails to disclose that the delay circuit delays the input random NRZ signal by a value of T (*claim 9*) or $(T-\delta)$ (*claim 10*).

It would have been an obvious matter of preference bounded by routine experimentation and optimization to choose the particular claimed delay value limitation because applicant has not disclosed that the limitation is for a particular unobvious purpose, produce an unexpected result, or are otherwise critical, and it appears prima facie that the process would possess utility using another delay value. Indeed, it has been held that optimization of range limitations are prima facie obvious absent a disclosure that the limitations are for a particular unobvious

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purpose, produce an unexpected result, or are otherwise critical. See MPEP 2144.05(II):

“Generally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. ‘[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.’” In re Aller, 220 F.2d 454, 105 USPQ 233, 235 (CCPA 1955). See also In re Hoeschele, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969), Merck & Co. Inc. v. Biocraft Laboratories Inc., 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), cert. denied, 493 U.S. 975 (1989), and In re Kulling, 897 F.2d 1147, 14 USPQ2d 1056 (Fed. Cir. 1990). As set forth in MPEP 2144.05(III), “Applicant can rebut a prima facie case of obviousness based on overlapping ranges by showing the criticality of the claimed range. ‘The law is replete with cases in which the difference between the claimed invention and the prior art is some range or other variable within the claims. . . . In such a situation, the applicant must show that the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range.’ In re Woodruff, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990). See MPEP § 716.02 - § 716.02(g) for a discussion of criticality and unexpected results.”

With respect to claim 14, Reed et al. discloses, in Figure 2, combination comprises a first multiplier circuit [231] for multiplying the input random NRZ signal [Yo] with the second signal (*from So*), a second multiplier circuit [230] for multiplying the second signal (*from So*) with the output of the delay circuit [210], and the subtractor circuit [240] subtracts the output of the second multiplier circuit from the output of the first multiplier circuit.

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With respect to claim 15, Reed et al. discloses, in Fig. 2, a phase detector circuit that outputs a DC voltage signal associated with a phase difference between an input random NRZ signal [Yo] and a second signal related to input random NRZ signal (*from So*), comprising 1) a delay circuit [210] for delaying the input random NRZ signal and 2) a combination of at least one multiplier circuit [230,231) and a subtractor circuit [240], which combination performs a mathematical operation on the input random NRZ signal, the delayed signal, and the second signal to produce an output signal having a DC voltage component corresponding to the phase difference; wherein the second signal is the same as said input random NRZ signal but differing in phase therefrom by an angle θ (*as shown by the phase error data*).

Reed et al. fails to disclose that the delay circuit delays the input random NRZ signal by a value of $(T-\delta T)$, where δT is a value less than T .

Similarly as stated above, it would have been an obvious matter of preference bounded by routine experimentation and optimization to choose the particular claimed delay value limitation because applicant has not disclosed that the limitation is for a particular unobvious purpose, produce an unexpected result, or are otherwise critical, and it appears prima facie that the process would possess utility using another delay value. Indeed, it has been held that optimization of range limitations are prima facie obvious absent a disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical. See MPEP 2144.05(II): "Generally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. '[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable

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ranges by routine experimentation.” In re Aller, 220 F.2d 454, 105 USPQ 233, 235 (CCPA 1955). See also In re Hoeschele, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969), Merck & Co. Inc. v. Biocraft Laboratories Inc., 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), cert. denied, 493 U.S. 975 (1989), and In re Kulling, 897 F.2d 1147, 14 USPQ2d 1056 (Fed. Cir. 1990). As set forth in MPEP 2144.05(III), “Applicant can rebut a prima facie case of obviousness based on overlapping ranges by showing the criticality of the claimed range. ‘The law is replete with cases in which the difference between the claimed invention and the prior art is some range or other variable within the claims. . . . In such a situation, the applicant must show that the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range.’ In re Woodruff, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990). See MPEP § 716.02 - § 716.02(g) for a discussion of criticality and unexpected results.”

8. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Reed et al. (U.S. Patent No. 6,493,163), in view of Iinuma (U.S. Patent No. 6,157,686).

With respect to claim 11, Reed et al. discloses all of the claimed limitations as expressly recited in claim 8; furthermore, Reed et al. discloses that the second signal differs from the input signal by a phase angle θ as shown by the phase error data. Reed et al. fails to disclose that the delay circuit comprises a latch circuit.

Iinuma discloses, in Fig. 2 and col. 5, line 13, that delay circuit 42 is comprised of a latch circuit for delaying.

To implement the phase detector of Reed et al. with a delay circuit comprised of a latch circuit to provide delay and data storage would have been obvious to one of ordinary skills in the

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art at the time of the invention since such configuration for the stated purpose has been a well known practice in the art as evidenced by the teachings of Iinuma (*see Fig. 2 and col. 5, line 13*).

9. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Reed et al. (U.S. Patent No. 6,493,163), in view of Bhagwan (U.S. Patent No. 5,661,419).

With respect to claim 12, Reed et al. discloses all of the claimed limitations as expressly recited in claim 8; furthermore, Reed et al. discloses that the second signal differs from the input signal by a phase angle θ as shown by the phase error data. Reed et al. fails to disclose that the delay circuit comprises a first voltage-controlled delay circuit and a control circuit for controlling the voltage-controlled delay.

Bhagwan discloses, in Fig. 2, a delay circuit comprises a voltage-controlled delay line [18] and a control circuit (*generates the control voltage signal*) for controlling the voltage-controlled delay.

To implement the phase detector of Reed et al. with a delay circuit comprised of a voltage-controlled delay circuit and a control circuit for controlling the voltage-controlled delay to provide adjustable delay therefore enhancing system synchronization would have been obvious to one of ordinary skills in the art at the time of the invention since such configuration for the stated purpose has been a well known practice in the art as evidenced by the teachings of Bhagwan (*see Fig. 2*).

Allowable Subject Matter

10. Claims 1-2 and 6-7 are allowed.

11. Claim 13 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

12. The following is a statement of reasons for the indication of allowable subject matter:

Prior art of record does not show or fairly suggest a phase detector having 1) an output $V_o(t)$ of the phase detector circuit represented by: $V_o(t) = (V_i(t) - V_i(t-T)) \times V_i(t - \theta T / 2\pi)$, where the signal $V_i(t-T)$ is delayed from the signal $V_i(t)$ by the period T of the signal $V_i(t)$; 2) a multiplier circuit for outputting a product of another input random NRZ signal having the same pattern as that of an input random NRZ signal and a phase difference and an output of a subtracter circuit, as called for in claims 2 and 6; 3) an output $V_o(t)$ of the phase detector circuit represented by: $V_o(t) = (V_i(t) - V_i(t-(T-\delta T))) \times V_i(t - \theta T / 2\pi)$, where the signal $V_i(t-\delta T)$ is delayed from the signal $V_i(t)$ by the time of $(T-\delta T)$ of the signal $V_i(t)$; and 4) a control circuit comprising a second voltage-controlled delay circuit that receives the clock signal and outputs a delayed version of the clock signal in accordance with a control signal, a phase difference detector for detecting a phase difference between the clock signal and the delayed version of the clock signal and outputting the detected phase difference to a low pass filter, which low pass filter outputs the control signal to the first and second voltage-controlled delay circuits, as called for in claim 13.

Citation of Relevant Prior Art

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

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Prior art Ozaki (U.S. Patent No. 4,721,904) discloses a digital phase detecting circuit.

Prior art Seki (U.S. Patent No. 3,840,817) discloses a phase detector circuit.

Inquiry

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Linh M. Nguyen whose telephone number is (703) 305-0414.

The examiner can normally be reached on Alternate Mon, Tuesday - Friday from 7:00 to 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy P Callahan can be reached on (703) 308-4876. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-0142 for regular communications and (703) 305-0142 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Linh M. Nguyen
Examiner
Art Unit 2816



LMN
July 18, 2003